

Chapter 5

Environmental Consequences of the Alternatives



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5.1 Introduction to Environmental Consequences

The Environmental Consequences of the Alternatives chapter consists of this overview and 24 individual sections that describe the potential impacts of the Base Case and the eight policy alternatives on each of the affected environmental resource areas. The sections are discussed in the same order as Chapter 4, Description of Affected Environment.

5.1.1 Organization of Resource Areas Sections

Each resource area section identifies the resource issues examined, explains the methods used to determine impacts, and describes the anticipated impacts under the Base Case and each policy alternative. Impacts identified for each policy alternative are based on the incremental change between the Base Case and the changes in each policy alternative. Impacts identified for the Base Case are based on changes associated with the existing environment plus future trends through the year 2030 and the projects and commitments made by TVA, as described in Chapter 3, Reservoir Operations Policy Alternatives.

5.1.2 Weekly Scheduling Model

The Weekly Scheduling Model (WSM) was a central tool in the analysis and impact assessment. This model was used to convert reservoir operations policy changes into predicted future changes in reservoir levels and discharges from each of the projects in the TVA water control system.

TVA developed the WSM to model major water control projects in the Tennessee and Cumberland River basins. Rainfall, runoff, and river flow data from the Tennessee River basin over the past 99 years (1903 through 2001) were used to develop and calibrate the model. The WSM output graphically depicts how elevation and flow would change under various scenarios. See Appendix C, Model Descriptions and Results, for additional details about the WSM and a presentation of modeling results for each of the reservoir policy alternatives.

It is important to note that the WSM is based on a weekly analysis. That is, the model provides predictions of average weekly reservoir levels, discharges, and power generation. The WSM does not predict how the reservoir levels, flows, or patterns of power generation would occur on an hourly or daily basis. For environmental analyses that required estimates of the effects of different alternatives on hourly and daily flows, a separate database was developed. This is described further in Section 5.4, Water Quality.

The WSM provided outputs for each alternative, for different reservoirs, and for different time periods. Depending on the output, a single week, groups of weeks, or an entire year (or years) can be selected. The various outputs that can be generated from the WSM include:

- Elevation and flow plots—show the elevation or flow of a reservoir over a defined period of time.

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- Generation and turbine capacity plots—show the generation or turbine capacity of a reservoir release over a defined period of time.
- Probability elevation and flow plots—show the distribution of elevation or flow data over the 99-year record of a reservoir over any defined set of weeks (e.g., Labor Day or the month of June).
- Elevation and flow duration curves—show the percent of time an elevation or flow will occur at a reservoir over any defined set of weeks (e.g., Labor Day or the month of June).

The WSM is important for the ROS EIS because reservoir elevations and reservoir releases and tailwater flows are the drivers for most impacts. This tool quantitatively compares the effects of alternatives on the water control system.

Results of the WSM are presented in Appendix C.